

REMARKS

Applicant respectfully thanks the Examiner for indicating the allowability of claims 4-6, 12-16, 18, and 37. Claims 1-11, 13-16, and 18-36 are currently pending in this application.

The Office Action of December 5, 2001 has been received and contents carefully reviewed. Reconsideration and reexamination of the application is respectfully requested.

The Examiner objected to the title of the invention. Although Applicant believes that the title of the invention is clearly indicative of the invention, for the purpose of expediting the prosecution of this application, the title has been changed. Therefore, Applicant requests the withdrawal of this objection.

Minor grammatical corrections have been made to the specification. No new matter has been added.

The Examiner rejected claims 28-30 under 35 U.S.C. § 112, second paragraph, as being indefinite as to the alignment characteristics of the at least two regions of the alignment film. Applicant respectfully traverses this rejection.

The liquid crystal molecules of the liquid crystal layer may be aligned differently on each of the at least two regions. The different alignment characteristics on each region include, but are not limited to, the alignment direction or the light used for photo-alignment or the alignment method, or whether an alignment process is performed. At least one region of the at least two regions may be a non-alignment region or both regions may be a non-alignment region. Therefore, dependent claims 29 and 30 are supported by the recitation in base claim 28 that the at least two regions have different alignment characteristics. Applicant respectfully submits that claims 28-30 are definite.

The Examiner rejected claims 1-3, 7-11, 17, and 19-36 under 35 U.S.C. § 103(a) as being unpatentable over Lien, U.S. Patent No. 5,907,380 in view of Ueda et al., U.S. Patent No. 5,459,596. Applicant respectfully traverses these rejections.

Applicant submits that claims 1-3, 7-11, 17, and 19-36 are allowable over the cited references in that each of the independent claims 1 and 35 recites a combination of elements including, for example, a common auxiliary electrode to surround the pixel region; a pixel electrode; and a plurality of electric field distortion dielectric structures in different forms within neighboring pixels.

None of the cited references including Lien and Ueda et al., which are cited against all of the rejected claims, singly or in combination, teaches or suggests at least these features of the claimed invention.

In the multi-domain liquid crystal display device as recited by claims 1 and 35, the common auxiliary electrode is formed on the same layer as the gate lines to surround the pixel region. The dielectric structures are patterned in different forms within neighboring pixels on the common electrode, so that electric field distortion can be induced. Thereby, control of the alignment direction is facilitated and the viewing angle and multi-domain effect are improved.

On page 3 of the Office Action, the Examiner states, "*Lien does not explicitly disclose a common auxiliary electrode formed to surround the pixel region.*" The Examiner cites Ueda et al. to cure the deficiencies of Lien. However, there is no motivation to combine these two references.

Lien employs a wall of transparent conductive material to control the tilt direction of the liquid crystal. Ueda et al. employs a shield electrode to reduce the parasitic capacitances

between the pixel electrode and the scan line and between the pixel electrode and the signal line. The Examiner states on page 4 of the Office Action that the motivation to combine the alleged common auxiliary electrode in Ueda et al. with the device of Lien is that *"this acts as a shield, reduces parasitic capacitance between the pixels and signal lines, and forms a storage capacitor without additional production steps."* This statement is not a motivation to combine the references--it merely describes the function of the shield electrode in Ueda et al.

Furthermore, the Examiner has not pointed out a particular finding as to the specific understanding or principle within the knowledge of a skilled artisan, either expressly or by implication that would have motivated one with no knowledge to combine or modify Lien. Accordingly, no proper motivation or suggestion is found in either Lien or Ueda et al. for one of ordinary skill in the art to combine the two teachings. Rather, Applicant respectfully submits that such combination is suggested only by the claimed invention and that combining is considered impermissible hindsight. Accordingly, Applicant respectfully requests withdrawal of the rejection based on the combination of Lien with Ueda et al.

On page 4 of the Office Action, the Examiner states, *"Lien does not explicitly show a passivation layer or the color filter layer being on the light-shielding layer, but these are conventional in the art and would be obvious to one [sic] of ordinary skill in order to avail themselves of well-established production methods"* and on page 5 of the Office Action, the Examiner states, *"Claims 7, 8, 17, 19, 20, 22, 24-26, and 32-34 disclose well-known details of LCDs which would be obvious to one [sic] of ordinary skill in the art, motivated by the desire to avail themselves of convention features."* The Examiner appears to take official notice by stating that a passivation layer on the gate insulating film including the first substrate, a color filter layer on the light-shielding layer, and the limitations in claims 7, 8,

17, 19, 20, 22, 24-26, and 32-34 are well-known, but fails to cite a reference in support of his position. Applicant respectfully traverses the assertion that the combination of elements recited in claims 1-3, 7-11, 17, and 19-36 are well-known, and request the Examiner to provide evidence in the next Office communication.

In view of these distinguishing features, Applicant submits that there is no teaching or suggestion in the cited references that would motivate one of ordinary skill in the art to arrive at the multi-domain liquid crystal display device of at least independent claims 1 and 35. Applicant submits that claims 1 and 35 and the claims that depend therefrom are allowable.

In view of these remarks and the amendments herein, Applicant respectfully submits that all of the pending claims of the application are in condition for immediate allowance.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. § 1.136, and any additional fees required under 37 C.F.R. § 1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911.

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If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 624-1200 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

Respectfully submitted,

LONG ALDRIDGE & NORMAN, LLP

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By 
Song K. Jung
Registration No: 35,210

Teresa M. Arroyo
Registration No: 50,015

701 Pennsylvania Avenue, N.W.
Sixth Floor, Suite 600
Washington, D.C. 20004
Telephone No.: (202) 624-1200
Facsimile No.: (202) 624-1298

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MARKED UP VERSION OF THE AMENDED TITLE

**MULTI-DOMAIN LIQUID CRYSTAL DISPLAY DEVICE HAVING A COMMON-
AUXILIARY ELECTRODE AND DIELECTRIC STRUCTURES**

MARKED UP VERSION OF THE AMENDED SPECIFICATION

Page 5, Paragraph beginning at line 17:

Fig. 2a is a [plane] plan view showing a multi-domain liquid crystal display device according to the first embodiment of the present invention;

Page 5, Paragraph beginning at line 23:

Fig. 3a is a [plane] plan view showing a multi-domain liquid crystal display device according to the second embodiment of the present invention;

Page 6, Paragraph beginning at line 5:

Fig. 4a is a [plane] plan view showing a multi-domain liquid crystal display device according to the third embodiment of the present invention;

Page 6, Paragraph beginning at line 11:

Fig. 5a is a [plane] plan view showing a multi-domain liquid crystal display device according to the fourth embodiment of the present invention;

Page 6, Paragraph beginning at line 17:

Fig. 6a is a [plane] plan view showing a multi-domain liquid crystal display device according to the fifth embodiment of the present invention;

Page 6, Paragraph beginning at line 23:

Figs. 7a to 7e are [plane] plan views showing a multi-domain liquid crystal display device according to the sixth embodiment of the present invention;

Page 7, Paragraph beginning at line 1:

Figs. 8a to 8e are [plane] plan views showing a multi-domain liquid crystal display device according to the seventh embodiment of the present invention;

Page 7, Paragraph beginning at line 4:

Figs. 9a to 9e are [plane] plan views showing a multi-domain liquid crystal display device according to the eighth embodiment of the present invention;

Page 7, Paragraph beginning at line 7:

Figs. 10a to 10e are [plane] plan views showing a multi-domain liquid crystal display device according to the ninth embodiment of the present invention; and

Page 7, Paragraph beginning at line 10:

Figs. 11a to 11e are [plane] plan views showing a multi-domain liquid crystal display device according to the tenth embodiment of the present invention;

Page 7, Paragraph beginning at line 23:

The data lines 3 and gate lines 1 are formed on the first substrate 21 lengthwise and crosswise to divide the first substrate into a plurality of pixel regions. The common auxiliary electrode 15 is formed on a layer equal to the gate lines to distort electric field. The thin film transistor is formed in each pixel region on the first substrate and includes a gate electrode

11, a gate insulating film 35, a semiconductor layer 5, an ohmic contact layer, and source[/] and drain electrodes 7 and 9. The passivation film 37 is formed on an entire surface of the first substrate 31. The pixel electrode 13 is formed on the passivation film 37 to be connected with the drain electrode 9.

Page 8, Paragraph beginning at line 22:

To fabricate the aforementioned multi-domain liquid crystal display device, the thin film transistor consisting of the gate electrode 11, the gate insulating film 35, the semiconductor layer 5, the ohmic contact layer and the source[/] and drain electrodes 7 and 9 is formed in each pixel region of the first substrate. At this time, the plurality of gate lines 1 and data lines 3 are formed to divide the first substrate into a plurality of pixel regions.

Page 9, Paragraph beginning at line 5:

The gate electrode 11 and gate lines 1 are formed in such a manner that metals such as Al, Mo, Cr, Ta, Al alloy or their alloys are layered by sputtering and patterned. At the same time, the common auxiliary electrode 15 is formed to surround the pixel region. Then, the gate insulating film 35 is formed in such a manner that SiNx or SiOx is deposited on the common auxiliary electrode 15 by plasma enhancement chemical vapor deposition (PECVD) method and patterned. Subsequently, the semiconductor layer 5 and the ohmic contact layer are formed in such a manner that a-Si and n⁺ a-Si are deposited by PECVD method and patterned. Furthermore, the gate insulating film 35, a-Si and n⁺ a-Si may successively be deposited and patterned. Metals such as Al, Mo, Cr, Ta, Al alloy or their alloys are layered by sputtering and patterned so that the data lines 3 and the source[/] and drain electrodes 7 and 9 are formed.

Page 13, Paragraph beginning at line 12:

Furthermore, in Figs. 3b and 3d, the [passovaiton] passivation film 37 is formed of a material such as SiNx or SiOx. In Figs. 3c and 3e, the passivation film is formed of BCB, acrylic resin or polyimide.

Page 15, Paragraph beginning at line 6:

Furthermore, in Figs. 5b and 5d, the [passivaiton] passivation film 37 is formed of a material such as SiNx or SiOx. In Figs. 5c and 5e, the passivation film 37 is formed of BCB, acrylic resin or polyimide.

Page 16, Paragraph beginning at line 4:

Furthermore, in Figs. 6b and 6d, the [passivaiton] passivation film 37 is formed of a material such as SiNx or SiOx. In Figs. 6c and 6e, the passivation film 37 is formed of BCB, acrylic resin or polyimide.

Page 16, Paragraph beginning at line 17:

Figs. 7, 8, 9, 10 and 11 show [plane] plan views of a multi-domain liquid crystal display device according to the sixth to tenth embodiments of the present invention.